

Assessment of Unconventional Oil and Gas Resources of the Lusitanian Basin, Portugal

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ABSTRACT

The U.S. Geological Survey (USGS) assessed undiscovered, technically recoverable shale-oil and shale-gas resources within the Lusitanian Basin, a geologically complex area encompassing approximately 20,000 square kilometers along the western margin of Portugal. The USGS defined a Lower Jurassic Total Petroleum System, which included the Brenha Group Shale Oil Assessment Unit and the Brenha Group Shale Gas Assessment Unit. The total petroleum system was defined and mapped using publically available data for thermal maturity, source-rock thickness, and total organic carbon. The geologic model for the assessment is for generation of oil and minor gas within marine source rocks of the Brenha Group to have occurred during the Cretaceous, with some portion of the oil or gas retained within the source rock following two phases of compression and structural inversion in the Cenozoic. For unconventional shale-oil resources the estimated means for the Brenha Group Shale Gas AU are 66 million barrels of oil, with an F95–F5 range from 0 to 223 million barrels of oil; and 5 billion cubic feet of gas (associated gas), with an F95–F5 range from 0 to 18 billion cubic feet of gas. The estimated mean resources for the Brenha Group Shale Gas AU are 84 billion cubic feet of gas, with an F95–F5 range from 0 to 317 billion cubic feet of gas; and 4 million barrels of natural gas liquids, with an F95–F5 range from 0 to 15 million barrels of natural gas liquids. The major source of geologic risk in assessment of recoverable resources in the Brenha Group Shale Oil Assessment Unit and Brenha Group Shale Gas Assessment Unit is the retention of recoverable oil or gas resources within Brenha Group source rocks following Cenozoic deformation.